REMARKS

Claims 6, 7 and 20-35 are pending in this application. Claims 26-35 were previously withdrawn. Claims 6, 7 and 20-25 stand rejected.

Claim 6 has been amended to recite an epoxy diacrylate resin and to delete the phrase "blended with an acrylic monomer". Support for this is found in the Product Overview of EPON and EPI-REZ Epoxy Resins submitted in the November 23, 2009 response to the restriction requirement.

Claims 20, 21, 33 and 35 have been amended to recite that the material comprises a silane treated cenosphere and that the fiberglass is pre-treated with epoxy silane. Support for this amendment is found in the specification on page 14, line 12 and page 7, lines 7-8.

Claim 26 has been amended to depend from claim 6, to delete the description of the cured epoxy (which is redundant because the claim depends from claim 6, which describes the epoxy) and to recite that the composition further comprises a first and second syntactic foam material where the epoxy is located between the first and second syntactic foam material. Support for this amendment is found in the specification on page 10, line 10-19.

Claim 28 has been amended to indicate that the material of claim 26 is very flexible and is able to achieve deflection of 45%. Support for this amendment is found in the specification on page 11, lines 7-8.

Constructive Election of Species

The Office Action indicates that claims 6, 7 and 20-25 and claims 26-35 are related as mutually exclusive species in an intermediate-final product relationship.

The Office Action further indicates that claims 26-34 are withdrawn from consideration as being directed to a non-elected invention due to the fact that the Applicants has received an action on the merits for the originally presented invention.

Applicants respectfully traverse this election of species and request the Examiner reconsider the Restriction Requirement. Claims 26-35 have been amended to depend from claim 6. Applicants respectfully submit that if the cured epoxy comprising an epoxy component mixture and a curing component mixture, as recited in claim 6, is found to be allowable, the compositions of claims 26-35 would at least be eligible for rejoinder, if they contain each of the elements recited in claim 6.

In the event that the Restriction Requirement is not withdrawn or claims 26-35 are not determined to be eligible for rejoinder, Applicants expressly reserve the right to pursue such claims in a divisional or continuation application.

Specification

1. The specification was objected to because the amendment to the specification filed December 15, 2010 allegedly encompasses myriad species of acrylic resin.

The first full paragraph on Page 7 of the specification has been amended to replace the previously amended paragraph. The difference in the paragraphs is the description of Byk 361. The amended paragraph recites that Byk 361 is an acrylate flow control agent. Support for this description is found in the Application Information CC-A 3 Additives for Gel Coats from BYK, a copy of which is enclosed as Attachment A.

2. The specification was objected to because the specification allegedly lists Epon 816 on Page 10, lines 14-15. Applicants respectfully call the Examiner's attention to the amendment filed November 23, 2009 in which this error was corrected.

3. Finally, the specification was objected to because the specification allegedly describes a compound and composition as novel without providing evidence that such materials are new.

Not to acquiesce in the Examiner's objection, but solely to facilitate prosecution, the second full paragraph on Page 11 and the paragraph bridging Page 16 and 17 have been amended to remove the term "novel."

35 U.S.C. § 112, first paragraph

Claims 6, 7 and 20-25 have been rejected under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the written description requirement.

1. The use of the term "monomer" in claim 6 has been objected to for alleged lack of support.

Claim 6 has been amended to delete the phrase "blended with an acrylic monomer", making this rejection moot.

2. The term "epoxy diacrylate" in claim 7 is objected to for alleged lack of support.

Applicants respectfully call the Examiner's attention to the Hexion Specialty Chemicals Product Brochure filed as Exhibit A on 11/23/09. In that brochure, Epon

8161 is described as a "moderate viscosity epoxy diacrylate resin with performance similar to Epon 828."

3. The phrase "acrylated silicon flow control agent" in claims 20 and 21 (and withdrawn claims 33 and 35) is objected to for alleged lack of substantiation.

The first full paragraph on Page 7 has been amended to describe Byk 361 as an acrylate flow control agent. Support for this is provided in the Office Action and in Attachment A. Application Information CC-A 3 Additives for Gel Coats from BYK.

4. The phrase "wherein the cured epoxy is sandwiched between the first and second syntactic foam materials" in claim 26 is objected to for alleged lack of substantiation.

Claim 26 has been amended to indicate that the cured epoxy is located between the first and second syntactic foam materials. Support for this is found in the specification on page 10, lines 10-19.

5. The phrase "the material under deflection of 45% maintains its structural integrity" in claim 28 is objected to for allegedly lacking description.

Claim 28 has been amended to indicate that the material of claim 26 is very flexible and is able to achieve deflections of 45%.

6. Claims 7, 20 and 21 (and withdrawn claims 33-35) are rejected as allegedly lacking enablement for "a viscosity-lowering diluent."

Claims 7, 21, 34 and 35 do not contain the phrase “a viscosity-lowering diluent.” Therefore the rejection of these claims should be withdrawn.

Claim 20 recites the phrase “a viscosity-lowering diluent”. The specification teaches that Epon 8132 and 816, contain Heloxy 9 as a diluent. One of ordinary skill in the art would recognize that other components were known in the art that could be added as a diluent to an epoxy resin and would reduce the viscosity of the resin. Such a person would recognize that "the primary function of a diluent in an epoxy resin formulation is to reduce its viscosity to either make it easier to compound with fillers, improve filler loading capacity, or to improve application properties. Solvents, certain curing agents, and flexibilized epoxy resins can also lower the viscosity of epoxy adhesive formulations, but this is not their primary function." (see http://www.specialchem4adhesives.com/resources/articles/article.aspx?id=1049). Should the Examiner require additional information to demonstrate that this was known to one of ordinary skill in the art, applicant requests that the Examiner contact applicant's representative below to obtain additional information.

Claim 33 does not recite the phrase “a viscosity-lowering diluent” but rather recites “a viscosity-lowering agent.” The specification teaches several compositions that lower the viscosity. These include Epon 8132, Epon 8161, Jeffamine D-230 and the silane used in the surface treatment of the cenospheres. Applicants respectfully submit that a skilled artisan would recognize that claim 33 is enabled for at least these specific components. Applicants submit that given the differences in the natures of the material in these components, one of ordinary skill in the art would recognize that other known viscosity-lowering agents could be used.

7. The phrase “silane treated cenosphere” in claim 7 (and withdrawn claim 34) is objected to as allegedly lacking enablement.

Applicants refer the Examiner to page 16, line 12 to page 17, line 6, which states in relevant part: In the preferred embodiment, the cenosphere are silane treated. A description of the silane surface treatment process used on the cenospheres of the present invention follows." (page 16, lines 12-13)

8. The “aluminosilicate” or “aluminosilicate ceramic” of claims 20 and 21 (and with withdrawn claims 33 and 35) is objected to as allegedly lacking enablement.

Claims 20 and 21 (and withdrawn claims 33 and 35) have been amended to indicate that the material comprises a silane treated cenosphere.

9. The “fiberglass” of claims 20 and 21 (and withdrawn claims 33 and 35) is objected to as allegedly lacking enablement.

Claims 20 and 21 (and withdrawn claims 33 and 35) have been amended to recite that the fiberglass is pre-treated with epoxy silane.

Applicants respectfully submit that the amended claims comply with the written description requirement and request the withdrawal of the 112, first paragraph rejections.

35 U.S.C. § 103(a) Obviousness Rejection

1. Claims 6 and 22-25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Weinmann et al. (U.S. Patent 6,395,845), in view of Neuner (U.S. Patent 6,160,041) and Matsuura et al. (U.S. Patent 6,046,072).

Applicants submit that claims 6 and 22-25 are not obvious over Weinmann in view of Neuner and Matsuura and that claims 6 and 22-25 are allowable.

To establish a *prima facie* case of obviousness, three basic criteria must be met. (MPEP 2143) First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Weinmann teaches a composition for waterproofing membranes used on roofs comprising epoxy resin, a liquid amine-terminated polyamide, an optional polyamine, an optional filler and an optional modifying resin (col. 2, lines 61-67 and col. 3, lines 1-3).

Neuner teaches a composition to substitute for concrete comprising an epoxy resin, an aliphatic glycidyl ether epoxy diluent, a polyoxypropyleneamine curing agent, intumescent powder, hollow ceramic microspheres and an air release reagent (col. 3, lines 22-34). Neuner teaches that the compositions form concrete-like materials which can be used as a substitute for concrete in building materials. The Office Action alleges that it would have been obvious to add the hollow ceramic microspheres of Neuner to the formulations of Weinmann in order to improve the compressive and tensile strengths. However, the compositions of Neuner are taught

to be concrete-like, not very flexible as the compositions of the present invention are taught to be in the specification.

Matsuura teaches a heat-resistant adhesive for use in the fabrication of a semiconductor package, preferably an adhesive with a principal constituent of thermpoplastic resin having a glass transition temperature of at least 200 degrees Celsius. (col. 3, lines 45-46). The Office Action alleges that it would have been obvious to combine the silica filler of Weinmann with the ceramic powder of Matsuura in order to enhance the heat resistance. The Office Action cites col. 9, lines 9-12 of Matsuura) The cited pages of Matsuura states:

> In addition, fillers such as ceramic powder, glass powder, silver powder and copper powder and coupling agents can also be added to the heat-resistant adhesive of the present invention. The heat-resistant adhesive according to the present invention can also be used after impregnating it with a base sheet such as glass fabric, aramid fabric and carbon fiber fabric.

This passage shows that the adhesive is already heat-resistant before the addition of fillers. This passage does not show that the addition of the ceramic powder would enhance the heat resistance, as claimed in the Office Action.

The Office Action admits that Weinmann does not recite the claimed ceramic particles.

To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There is no suggestion or motivation in Weinmann, Neuner or Matsuura to modify Weinmann to obtain the composition of the present invention. Weinmann relates to flexible compositions useful for waterproofing membranes used on roofs. One of ordinary skill in the art would recognize that

flexibility was important for such a composition and would not have combined an element from the composition of Neuner that helps provide that composition with concrete-like properties. In addition, as shown above, Matsuura does not show that the addition of the ceramic powder would enhance the heat resistance, as claimed in the Office Action. With regard to claims 22, 23 and 25, the cited prior art references do not provide any suggestion or motivation to modify Weinmann to obtain a composition that has these elements. Therefore, there was no suggestion or motivation, either in the reference itself or in the knowledge then generally available to one of ordinary skill in the art, to modify the reference to arrive at the claimed invention.

To establish a *prima facie* case of obviousness, there must be a reasonable expectation of success. There would not have been a reasonable expectation of success in obtaining the claimed invention, especially where the materials of the instant application are taught to be highly flexible. The Office Action relies on the combination of Weinmann and Neuner. As shown above, one of ordinary skill in the art would recognize that flexibility was important for the compositions of Weinmann and would not have combined an element from the composition of Neuner that helps provide that composition with concrete-like properties. In addition, as shown above, Matsuura does not show that the addition of the ceramic powder would enhance the heat resistance, as claimed in the Office Action. The composition of Neuner is taught to form compositions that have cement-like properties and that the compositions can be used as replacements for concrete. With regard to claims 22, 23 and 25, the cited prior art references do not provide any suggestion, motivation or teachings to modify Weinmann to obtain a composition that has these elements.

There cannot be a reasonable expectation of success in obtaining these claimed compositions when the prior art is silent on these properties. Therefore, there would not have been a reasonable expectation of success in modifying Wolf or Neuner to arrive at the claimed invention.

To establish a *prima facie* case of obviousness, the prior art reference must teach or suggest all the claim limitations. As shown above, one of ordinary skill the art would not find the motivation to combine the references as cited in the Office Action. It is only by such a combination that the Office Action has been able to obtain the various references, which are from different fields, to obtain references that disclose the cited claim limitations. With regard to claims 22, 23 and 25, not of the cited prior art references teach or suggest these elements. Therefore the cited references would not have taught or suggested to one of ordinary skill in the art all the claim limitations.

Applicants respectfully submit that claims 6 and 22-25 are not obvious over Weinmann, Neuner and Matsuura, and therefore request the withdrawal of the rejection of claims 6 and 22-25 under 35 U.S.C. § 103(a).

2. Claims 7, 20 and 21 stand rejected over Weinmann, Neuner and Matsuura and further in view of Flynn et al. (U.S. Patent No. 5,229,252).

Claims 7, 20 and 21 are not obvious over Weinmann, Neuner and Matsuura and further in view of Flynn et al.

Claims 7, 20 and 21 depend from claim 6. It was shown above that claim 6 is not obvious over Weinmann, Neuner and Matsuura. The teachings of Flynn do not overcome the deficiencies noted above for Weinmann, Neuner and Matsuura.

Claims 7, 20 and 21 are not obvious over Weinmann, Neuner and Matsuura and further in view of Flynn for the same reasons provided above. These reasons are not being repeated again, to facilitate review.

Applicants respectfully submit that claims 7, 20 and 21 are not obvious over Weinmann, Neuner and Matsuura and further in view of Flynn, and therefore request the withdrawal of the rejection of claims 7, 20 and 21 under 35 U.S.C. § 103(a).

Conclusion

For at least the reasons stated above, the Examiner is respectfully requested to reconsider and withdraw the outstanding rejections and objections, and to allow the present application.

In the event that there are any questions concerning this amendment, or the application in general, the Examiner is respectfully urged to telephone the undersigned attorney so that prosecution of the application may be expedited.

The Director is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.20(d) and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

Date: July 12, 2011

By: /Gary D. Mangels, Ph.D./
Gary D Mangels, Ph.D.
Registration No. 55424

Customer No. 21839
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Attachment A. Application Information CC-A 3 Additives for Gel Coats from BYK

BYK
Additives & Instruments

Substance for Success

Application Information CC-A 3

Additives for Gel Coats

A member of ALTANA

Application information CC-A 3

Air Release Additives

Entrapped air bubbles are a common problem in the manufacture and application of unsaturated polyester gel coats. They are difficult to remove mainly because most gel coats are highly thixotropic. In addition, they are usually applied by airless spray equipment in a single pass to a wet film thickness of 400 to 500 µm. These same air bubbles ultimately develop into pinholes leading to increased porosity and dramatically reduced water resistance of the gel coat.

The example (figure 1) shows a spray gel coat with and without BYK-A 555. Hot water resistance at 98 °C is dramatically improved in the samples with BYK-A 555.

The following standard additives can be used in almost all gel coat formulations to improve air release properties during manufacturing and application.

BYK-A 555 is widely used in all types of gel coats. It is the most efficient air release additive.

BYK-A 560 is the newest product in the group. It offers good air release properties with improved leveling, especially in spray gel coats.

BYK-A 550 shows high effectiveness with minimal haze and is recommended for transparent gel coats.

Influence of Air Entrapment on Hot Water Resistance

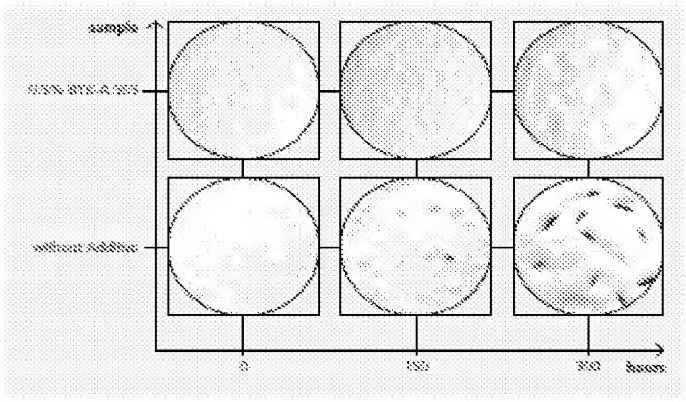


figure 1

Additives to Improve Flow/Leveling and Prevention of Craters and Fish Eyes

Depending on the application method, uniform flow and leveling of the applied gel coat is required. Brushed gel coats can vary in film thickness due to insufficient flow and leveling properties.

Good wetting of the mold surface by the gel coat is a critical factor! Poor substrate wetting occurs when the gel coat is higher in surface tension than the mold surface (figure 2).

Fisheyes appear due to surface tension differences between the mold releasing film, the gel coat film and dust particles (figure 3). When a dust particle falls into the gel coat film, the gel coat cannot wet the particle because of its high surface tension. To solve the fisheye problem, it is necessary to reduce the surface tension of the gel coat.

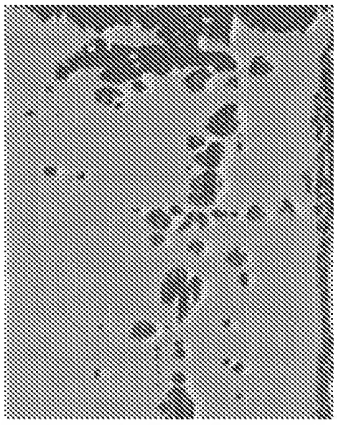
Possible solutions to improve substrate wetting and eliminate fisheyes are:

Silicones
in case of large surface tension differences

Acrylate Leveling Additives
in case of small surface tension differences

>

Substrate Wetting



Poor wetting of mold surface due to high surface tension of gel coat.

figure 2

Craters

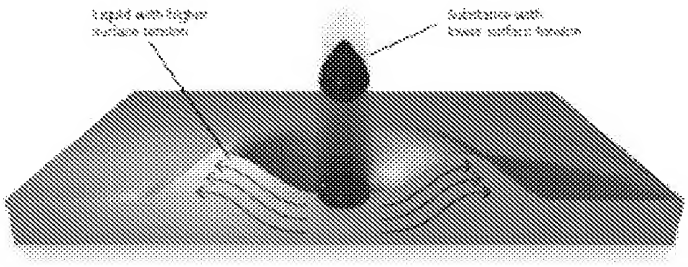


figure 3

Additives to Improve Flow/Leveling and Prevention of Craters and Fish Eyes

Effect of BYK-330

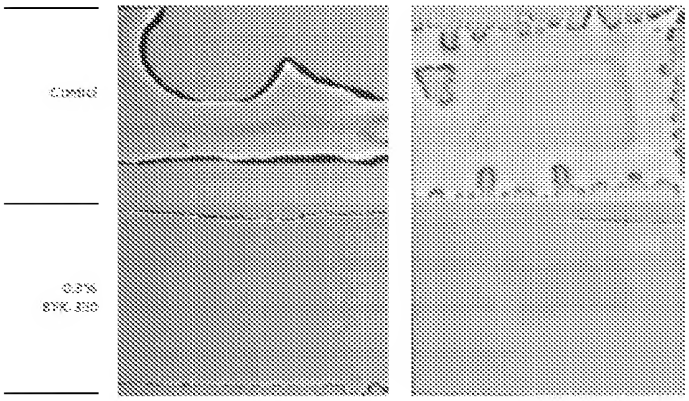
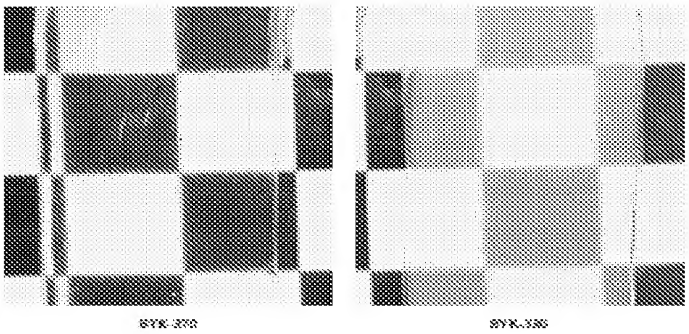


Figure 4

Comparison of BYK-370 and BYK-330 in a Clear Gel Coat



BYK-370 provides good substrate wetting without causing turbidity

Figure 5

Silicones

BYK-330 reduces the surface tension of the gel coat, improves flow and leveling, and eliminates fisheyes. Because of its controlled compatibility in the gel coat, it does not stabilize foam.

BYK-370 improves the flow and leveling of the gel coat. Typically, it is compatible with unsaturated polyester resins. BYK-370 is especially effective in clear gel coats.

BYK-306 is a compatible silicone that lowers surface tension and improves flow and leveling. It may stabilize foam, so very low use levels are recommended.

BYK-378 causes strong reduction of surface tension combined with low foam stabilization. It improves substrate wetting and prevents cratering.

Acrylates

BYK-S 706 is widely used in unsaturated polyester gel coats. It improves the flow and leveling properties of the applied gel coat film and helps surface deaeration. It is often used in continuous lamination processes to improve the flow and leveling of the gel coat film and prevent fisheyes. BYK-S 706 will introduce a slight turbidity in clear gel coats.

BYK-361 improves the flow and leveling properties of the applied gel coat film and eliminates craters and fisheyes. BYK-361 is more compatible than BYK-S 706 and can be used in clear gel coats.

Additives to Improve Thixotropy

Thixotropy is very important in gel coats but various problems may occur.

- no development of thixotropy
- development of thixotropy is too slow
- thixotropy drift over time

Since fumed silica is typically used to introduce thixotropy, it is very important that the fumed silica be well dispersed into the gel coat resin. Depending on the base resin type, the wetting of the fumed silica can be challenging.

To improve the wetting and dispersion of fumed silica and enhance thixotropic properties, BYK-R 605 and BYK-R 606 were developed.

BYK-R 605 should be added to the resin before the silica to enhance the wetting and dispersion of the silica. This results in an improved silica dispersion and an enhanced thixotropic effect as well as maintaining the thixotropy on aging.

BYK-R 606 is solvent free and offers an improved effectiveness compared to BYK-R 605.

Vinyl Ester Gel Coats
Hydrophilic fumed silica is usually not effective in vinyl ester resins. Hydrophobic fumed silica can be used to create thixotropy, but it is very difficult to get air release and good surface appearance. By using **BYK-R 605** or **BYK-R 606** in combination with hydrophilic fumed silicas, it is possible to create the required thixotropy while retaining good air release, flow, and leveling properties.

Vinyl Ester Gel Coat with BYK-R 605

Vinyl ester resin	100.0 parts
BYK-A 555	0.5 parts
Fumed silica	1.8 parts
BYK-R 605	0.6 parts
Pigment	10.0 parts
Cobalt (1%)	3.0 parts
DMA (10%)	1.0 parts
Peroxide	2.0 parts

BYK-R 605 Exhibits Best Results in Vinyl Ester Gel Coats

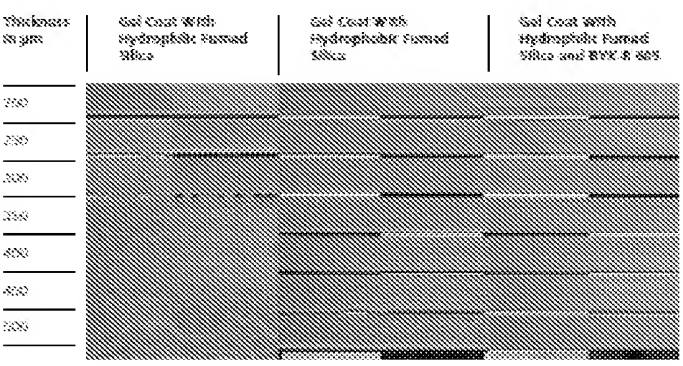


figure 6

Additives to Prevent Flooding and Floating

Flooding and floating of pigments can be influenced by many variables. Most important are the type of pigments or pigment mixtures, the grinding resin, degree of dispersion and pigment stabilization, the thixotropy of the gel coat and the application method. It is critical that the pigments used are properly dispersed in the polyester resin and, after grinding, properly stabilized so that re-agglomeration and uncontrolled flocculation do not occur.

When flooding and floating problems exist, basically, two approaches are possible:

1. Stabilization of the Pigmented System Via Controlled Flocculation of the Pigments
In this case, the wetting and dispersing additive is able to develop a loose bridging network between the pigment particles (figure 7). Typical products are **BYK-W 940**, **BYK-W 960** and **BYK-2205**.

The advantage of these products is that they do not dramatically influence the thixotropy of the gel coat. They should be added to the system before the pigment grinding stage. In some cases, it is possible to correct flooding and floating by post-addition of BYK-W 940 or BYK-2205 to the final gel coat.

2. Stabilization of the Pigmented System Via Deflocculation of Pigments
The use of high molecular weight block copolymers with many pigment affinic groups, provides excellent steric stabilization, preventing pigment flocculation. This stabilizes the color strength and hue of pigments in gel coats and pigment concentrates.

Typical products are **DISPERBYK-163**, **DISPERBYK-166**, **DISPERBYK-167**, **DISPERBYK-171** and **DISPERBYK-192**. These additives must be used in the pigment grinding step. They are highly effective and mainly used in color pastes for gel coats.
It is important to check for possible detrimental effects on the thixotropy of the final gel coat. The additive's wetting effect on fumed silica may reduce the ability of fumed silica to develop thixotropy.

Controlled Flocculation

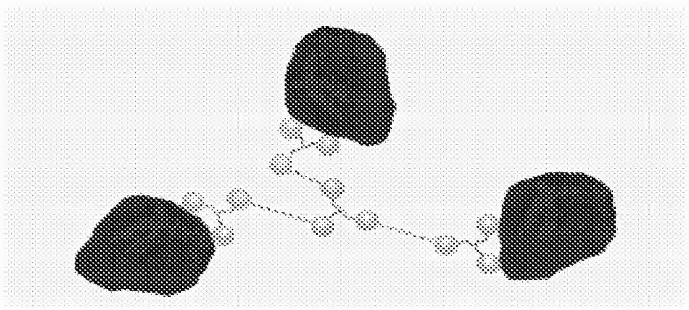


figure 7

Deflocculation With High Molecular Weight Block Copolymers

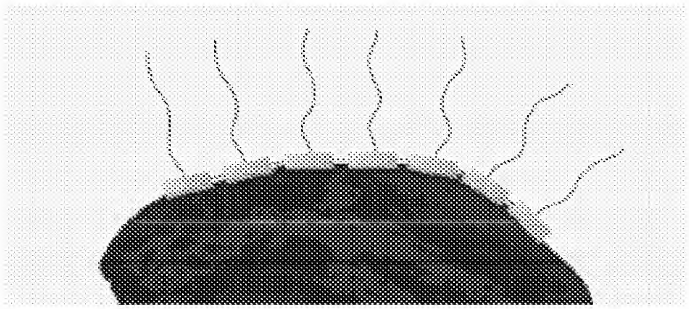


figure 8

Additives for Gel Coats

	Pigmented		Transparent Gel Coats
	Spray Gel Coats	Brush Gel Coats	
Air Release			
BYK-A 506			
BYK-A 501			
BYK-A 515			
BYK-A 530			
BYK-A 555			
BYK-A 560			
Flooding and Floating			
BYK-2265			
BYK-W 948			
BYK-W 986			
DISPERBYK-163			
DISPERBYK-186			
DISPERBYK-187			
DISPERBYK-171			
DISPERBYK-192			
Thixotropy			
BYK-R 605			
BYK-R 606			
Flow and Leveling			
BYK-366			
BYK-330			
BYK-378			
BYK-378			
BYK-S 706			
BYK-361			

Excellent Good

Application Information C.C.A. 1

Products and Applications

BYK Additives

Additives are used during the production of coatings, printing inks and plastics to optimize the production process and to improve the quality of the final product.

Product Range Additives
- Additives to improve surface slip, leveling and substrate wetting
- Adhesion promoters
- Defoamers and air release agents
- Foam stabilizers
- Processing additives
- Rheological additives
- UV absorbers
- Viscosity depressants
- Waxes
- Wetting and dispersing additives for pigments and extenders

Application Areas
- Ambient curing resins (FRP)
- Architectural coatings
- Automotive OEM
- Automotive refinishes
- Can coatings
- Coil coatings
- Color masterbatches
- Industrial coatings
- Leather coatings
- Marine paints
- Molding compounds
- Paper coatings
- Pigment concentrates
- Polyurethane foams
- Powder coatings
- Printing inks
- Protective coatings
- PVC plastisols
- Thermoplastics
- Wood and furniture coatings

BYK Instruments

BYK offers a complete line of testing instruments to meet your needs in many application areas:
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- Color

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